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A REVISION OF THE EUROPEAN LAEMOPHLOEINAE (COLEOPTERA : CUCUJIDAE)

By L. P. Lefkovitch

(*Pest Infestation Laboratory, Slough, Bucks.*)

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With 53 Text-figures

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I. Introduction

Until recently, the European beetles belonging to the Cucujid sub-family Laemophloeinae have been considered as belonging to two genera, *Laemophloeus* Dejean, 1837 and *Lathropus* Erichson, 1845 (Hetschko, 1930; Joy, 1932; Kloet and Hincks, 1945; Lechanteur, 1950). The heterogeneity of *Laemophloeus* was first recognised by Thomson (1863) who divided *Laemophloeus* into two sub-genera, *Laemophloeus* s.s. and *Leptus*. *Leptus* was preoccupied and the sub-genus was renamed *Cryptolestes* by Ganglbauer (1899). Sharp (1899), Casey (1916) and Kessel (1921), realising that this division into two by the visible presence or absence of the so-called frontoclypeal suture was unsatisfactory, proposed the erection of other categories. These workers were not followed subsequently until Steel and Howe (1955) pointed out that the species occurring commonly in stored food belong to *Cryptolestes* which, following Casey (1916), they considered merited generic status. Howe and Lefkovitch (1957) and Lefkovitch (1957, 1958*a*, *b*) have followed Steel and Howe (*op. cit.*) and by implication have considered that the other categories proposed by

Sharp (1899) and Casey (1916) represent distinct and valid genera. The sub-genera proposed by Kessel (1921) were found in most cases to be based upon male secondary sexual characters of doubtful taxonomic value (Lefkovitch, 1958*b*) and therefore have not been accepted.

This present study was undertaken to provide a basis for investigation of the world representatives of this sub-family and to enable more accurate determinations to be made of *Cryptolestes* spp., some of which are of economic importance in stored foods and whose identification has presented great difficulty in the past. The different genera can be easily recognised at sight by their general facies, although care should be taken when distinguishing *Leptophloeus* from *Cryptolestes*, since each of these genera possesses species which superficially resemble species belonging to the other genus.

In the generic description and redescriptions, non-European representatives have been taken into consideration and the generic key will work for non-European species. There are several genera not represented in Europe and there are a large number of non-European species without the characters of published genera but which can be separated into natural groups. It is hoped to characterise these groups in subsequent publications.

Detailed redescriptions of the species are not given; in those separations which have previously been found difficult the generic key will serve to clarify the problem, since most of the confusion has been between species belonging to what are now considered different genera. The author has seen specimens of almost all the European Laemophloeinae (with the exception of those of *Laemophloeus* s.s.) misidentified as *Cryptolestes ferrugineus* (Steph.), the most abundantly found species in the sub-family; the almost classical confusion between *C. turcicus* (Gr.) and *C. pusillus* (Schön.), species now known to possess different ecological preferences, should not have persisted after the publication of figures of the genitalia of both species by Reid (1942). It is hoped that the keys and figures presented here will give a better understanding of the group.

In concluding these introductory remarks, it is worth pointing out that the division of *Laemophloeus* s.l. into natural groups of species has presented no difficulties—numerous differences occur between the different genera. The ease with which the species have been assigned to genera is a reflection on the neglect of the study of the Laemophloeinae since the death of A. Grouvelle in 1917 and the attempt to make a key to the world species by Kessel (1926).

Much valuable information on the biology of the species considered has been taken from Wheeler (1921) and Lechanteur (1950); some original observations based upon specimens identified by the author have been added.

II. Characteristics of the sub-family Laemophloeinae

Crowson (1955), in commenting upon the Cucujidae, wrote: "The characterisation of this family has hitherto been very unsatisfactory; as a result there has been a tendency to use it as a 'dumping ground' for Clavicorn types of uncertain affinities and even for true Heteromera ...". This situation was recognised earlier by Casey (1916) who described the family as an "assemblage of incongruities". Similar comments can be made about *Laemophloeus* s. l., a group so varied that it can only be defined as "small Cucujids with lateral carinae on the pronotum".

Crowson separates the sub-family from other Cucujids by the following features :— *Adult* : species much flattened ; met-endosternite not of hylecoetoid type ; front coxal cavities usually nearly or quite closed behind ; tarsi 5–5–5 in female, 5–5–4 in male ; maxillae not at all concealed by projections of the head-capsule ; mandibles less prominent than in Prostominae ; all coxae rather widely separated ; pronotum with lateral raised lines parallel to its margins. *Larva* : maxillary mala obtuse ; maxilla without a distinct cardo, articulating area obsolete.

There are certain species which quite clearly belong to the Laemophloeinae but which do not have all these diagnostic features. In Europe the genus *Leptophloeus* contains such species ; the tarsi are 5–5–5 in both sexes and the adults can hardly be considered to be flattened (fig. 47).

In addition to the structures listed above, it seems likely that there are fundamental differences in the proportions and shape of the trophi between the Cucujid sub-families. For example, the ligula in the Cucujinae is deeply divided, in the Phloestichinae it is shallowly divided, in the Laemophloeinae it, at the most, shows a slight sinuation anteriorly, whereas in the Prostominae the ligula is pointed anteriorly at the mid-line. The mouthparts can be of great value in diagnosing the different genera, although their examination may not necessarily be essential for accurate recognition of a genus. The nature of the fronto-clypeal suture and the shape of the intercoxal process of the first abdominal segment are considered to be of possible taxonomic importance in the definition of taxa above that of the genus.

III. Key to genera of European Laemophloeinae

1 Lateral carinae not present on the head ; last tarsal segment about twice as long as the preceding four taken together **Lathropus** Erichson

– Lateral carinae present on the head ; last tarsal segment about as long as or shorter than the preceding four taken together . . . 2

2 Clypeus separated from the frons by a transverse furrow at the base of which is situated the frontoclypeal suture 3

– Clypeus not separated from the frons by a transverse furrow, but only by the line of the frontoclypeal suture which may or may not be visible 4

3 Front angles of pronotum produced into an acute tooth ; intercoxal process of the first visible abdominal sternite straight anteriorly ; elytra leaving at least tip of abdomen exposed . **Placonotus** Macleay

– Front angles of pronotum not produced into an acute tooth ; intercoxal process of first visible abdominal sternite pointed anteriorly ; elytra normally covering the whole abdomen . . **Laemophloeus** Dejean

4 Anterior region of head usually with three emarginations but sometimes five are visible, the outer ones being very small ; frontoclypeal suture usually visible . . . . . **Notolaemus gen. n.**

– Epistoma straight or with one shallow emargination ; frontoclypeal suture very rarely visible 5

5 Flattened transversely (fig. 46) ; metasternum only slightly curved in section ; elytra usually at most twice longer than their combined width, sometimes longer ; antennae of female usually equal in length to half that of body, in male antennae longer than those of female of same body length, sometimes as long as the body, in one species

antennae shorter than half body length; male tarsal formula 5–5–4. (External secondary sexual dimorphism present) **Cryptolestes** Ganglbauer

– Ovoid transversely (fig. 47); metasternum broadly V-shaped in section; elytra usually more than twice longer than combined width; antennae never attaining half the body length in either sex; male tarsal formula 5–5–5. (No external secondary sexual dimorphism usually apparent) . . . . . **Leptophloeus** Casey

IV. Descriptions of the genera with Keys to and Notes on Species

(1) *Lathropus* Erichson (Figs. 1–5).

Lathropus Erichson, 1846, *Naturgesch. Ins. Deutsch.* Abt. 1, 3 : 307, 327.

Figs. 1–5.—*Lathropus sepicola* (Müll.): (1) dorsal view; (2) labrum; (3) mandible; (4) maxilla; (5) labium. Scale line for adult 0·28 mm.; for trophi 0·1 mm.

This genus is represented by species in the New World and in Australia in addition to Europe, although the Australian representatives appear to be but distantly related to the others.

Head transverse, without lateral carinae; epistoma shallowly emarginate; *eyes* large; *antennae* short, reaching about the mid-point of the pronotum, scape and pedicel about equal in size to each other, segments 3 to 8 smaller, segments 9 to 11 abruptly larger forming a distinct club; derm rugose with fine microsculpture; *labrum* twice wider than long, broadly rounded anteriorly (fig. 2); *mandibles* with large prostheca, with three teeth apically (fig. 3); *maxillae* with a two-pointed lacinia, with terminal segment of palpi about two and a half times as long as preceding segment (fig. 4); *labium* with ligula evenly rounded anteriorly, with terminal segment of the short palpi noticably dilated proximally (fig. 5).

Pronotum transverse, with a lateral carina on each side, with lateral margins irregularly crenate ; anterior angles acute, posterior right-angled ; four shallow depressions on the disc ; distance between front angles equal to that between hind angles ; this distance wider than head ; derm as that of head. *Scutellum* pentagonal. *Elytra* wider at shoulders than pronotum at widest ; striate but without lateral carina ; entirely covering the abdomen.

Hind *coxae* more widely separated than the front and middle coxae. Anterior coxal cavities narrowly open posteriorly. Intercoxal process of the first visible abdominal *sternite* straight anteriorly, this sternite twice as long as the second in the mid-line ; second to fifth sternites equal in length.

Legs about equal in length, femora moderately dilated, last tarsal segment twice longer than the preceding four taken together.

There is one European species.

Lathropus sepicola (Müller)

Trogosita ? sepicola Müller, 1821, *Mag. Ent.* (Germar) 4 : 208.

Adults of this black species have been recorded in the galleries of *Scolytus multistriatus* (Marsh.), *Pteleobius vittatus* (F.) and *P. kraatzi* Eich. under elm bark. It has not been possible to locate the type of this species.

(2) *Laemophloeus* Dejean (Figs. 6–10)

Laemophloeus Dejean, 1837, *Cat. Col. Dejean* : 340.

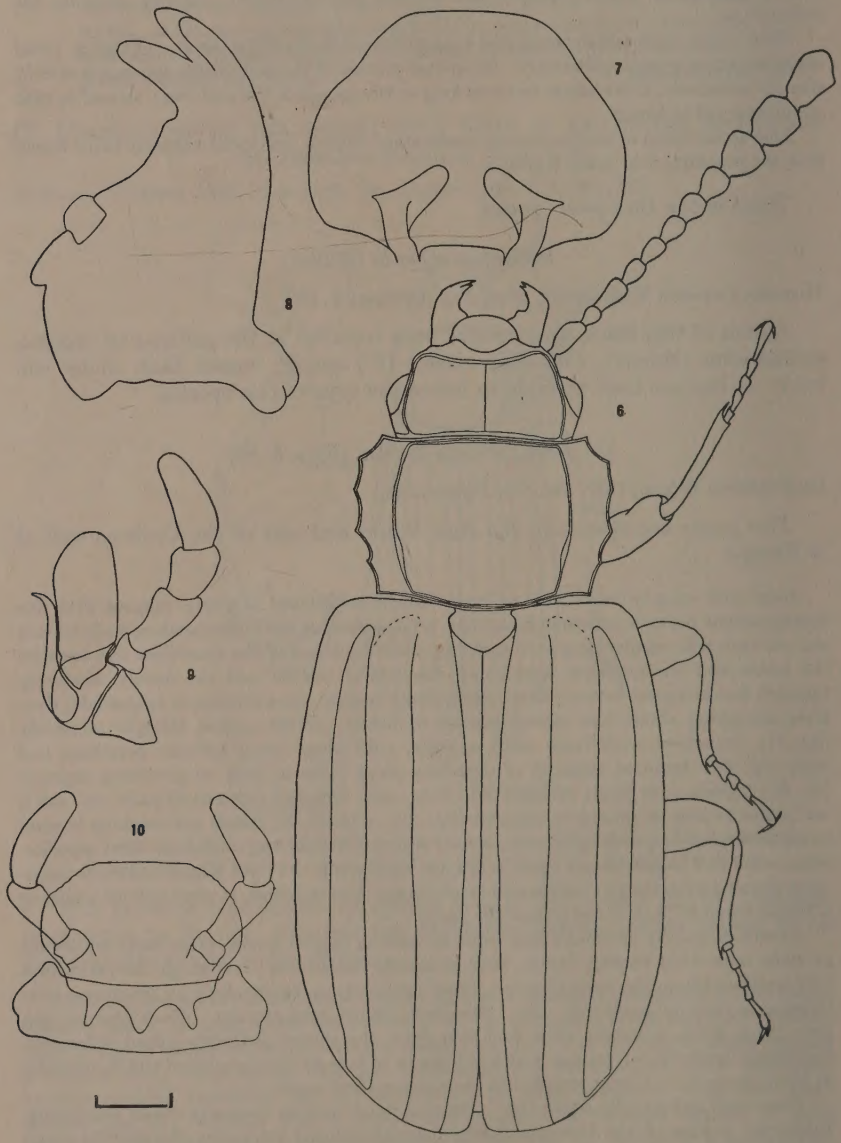
This genus has species in the New World and east of the Urals as well as in Europe.

Head with eyes twice as wide as long without trophi and labrum ; clypeus with five emarginations between antennal insertions, a large median one corresponding with labrum and on each side smaller ones corresponding with the bases of the mandibles and between the latter and the antennal insertions ; the lateral carinae and the evenly, shallowly rounded frontoclypeal suture joined transversely basally, thus forming a trapezoidal disc. *Eyes* occupying about half lateral margin of head ; *labrum* almost straight anteriorly (fig. 7) ; mandibles with three teeth apically, with blunt tooth between prostheca and apex (fig. 8) ; terminal segment of *maxillary* palpi twice as long as preceding segment (fig. 9) ; *labium* with ligula straight anteriorly, with terminal segment of palpi one and a half times as long as preceding segment (fig. 10) ; *antennae* in *female* not reaching beyond basal third of elytra, usually shorter, second segment half as long as first or third segment, segments 3 to 8 longer, about equal in length, segments 9 to 11 yet longer and more transverse forming a loose club ; antennae in *male* longer than in *female*, in some species attaining a length equal to that of the rest of the body.

Pronotum usually one and a half times as wide as long in *female*, often more transverse in *male*, narrowing basally, lateral margin usually denticulate ; the single lateral carinae well separated from the lateral border, joined anteriorly and posteriorly by transverse lines forming a definite cordiform disc. *Scutellum* almost semi-circular. Each *elytron* with four discal striae, numbers three and four from the suture distinctly joined anteriorly, the fourth carinate ; elytra one and a half times as long as their combined width, broadest at hind coxae, each evenly rounded to the apico-sutural angle.

Coxae well and equally separated. Anterior coxal cavities narrowly closed posteriorly. Intercoxal process of first visible abdominal *sternite* pointed anteriorly, this sternite about one and a half times as long at the mid-line as the second sternite ; second, third and fourth sternites about equal in length, fifth sternite slightly longer than fourth.

Legs about equal in length; femora dilated, slightly longer than the tibiae, tibiae apically with two ventral spines; tarsi with basal, third and fourth segments equal in length, second segment slightly longer, fifth about equal to combined lengths of second, third and fourth; tarsal formula 5–5–5 in *female*, 5–5–4 in *male*.



FIGS. 6–10.—*Laemophloeus monilis* (F.): (6) dorsal view; (7) labrum; (8) mandible; (9) maxilla; (10) labium. Scale line for adult 0·28 mm.; for trophi 0·1 mm.

There has been some doubt about the generic type of *Laemophloeus* ; this has arisen partially because of a lack of completeness in the Junk catalogue (Hetschko, 1930). This gives Laporte, 1840 as the first user of the name *Laemophloeus* (Laporte actually used the spelling *Loemophloeus* but these two spellings are nomenclatorially equivalent) ; he listed one species, *monilis* F. However, Dejean (1837) gave a list of species in *Laemophloeus*, putting *monilis* F. at the head, but not giving any further description. It is likely that Laporte knew Dejean's publication and, in the preparation of his own book, mistranscribed the diphthong and gave the first species in Dejean's list as an example of the genus. This has led to the idea (owing to Hetschko's omission) that *Laemophloeus* was monobasic and that *monilis* F. is the generic type without further need of selection. To promote stability in the nomenclature of the Laemophloeinae, I hereby propose *Cucujus monilis* Fabricius, 1787 to be the generic type of *Laemophloeus* Dejean, 1837.

Key to European species of Laemophloeus *s.s.*

1	Elytra uniformly black	**muticus** (Fabricius)
–	Elytra bicoloured, with a reddish mark on the anterior half of each .	2
2	Head and pronotum brown with a darker mark on the disc	**monilis** (Fabricius)
–	Head and pronotum unicolorous black or brownish-black . . .	3
3	Elytra 1·3–1·6 times longer than their combined width, their setae very short, hardly visible ; male antennal segments at most 1·5 times longer than wide, terminal segment hardly as long as and less robust than tenth segment	**nigricollis** Lucas
–	Elytra 1·8 times longer than their combined width, their setae longer and easily visible ; male antennal segments usually twice longer than wide, terminal segment 1·3 times as long as and as robust as tenth segment	**kraussi** Ganglbauer

Laemophloeus monilis (Fabricius)

Cucujus monilis Fabricius, 1787, *Mantissa Insectorum* **1** : 116.
Silpha denticulata Preyssler, 1791, *in* Mayer, *Samml. phys. Aufs.* **1** : 117.
Cucujus bipustulatus Panzer, 1793, *Fauna Insectorum Germanica* **4** : 13.
Cucujus bimaculatus Olivier, 1795, *Entomologie* **4** : 6.

The single type specimen, a female, from the Fabricius private collection has been examined. The present writer is able to confirm that the standard European keys were correct in their recognition of this species.

L. monilis has been recorded from the cones of conifers, in the burrows of *Taphrorychus bicolor* (Herbst) on lime trees and under the bark of dead lime.

Laemophloeus nigricollis Lucas

Laemophloeus nigricollis Lucas, 1849, *Explor. Sci. Algérie. Crustacés, Arachnides, Myriapodes et Hexapodes* **2** : 478.

It has not been possible to examine the type of this species. However, although it resembles *L. kraussi* very closely in its general appearance, its beadlike antennal segments distinguish it at once from that species, in which the antennal segments are elongate. *L. nigricollis* has been recorded from under the bark of the cork-oak.

Laemophloeus kraussi Ganglbauer

Laemophloeus kraussi Ganglbauer, 1897, *Verh. zool.-bot. Ges. Wien* **46** : 569.

The holotype of this species has been examined with some care since previous workers have failed to provide adequate features for distinguishing it from *L. nigricollis* Lucas. The elongate antennal segments were found to be most characteristic and the terminal segment to be slightly curved, as in the North American *L. terminalis* Casey. Nothing is known of the biology of this species.

Laemophloeus muticus (Fabricius)

Cucujus muticus Fabricius, 1781, *Species Insectorum* **1** : 257.
Cucujus piceus Olivier, 1795, *Entomologie* **4** : 6.
Cucujus labiatus Kugelann, 1794, *in* Schneider, *Neuestes Mag. Liebh. Ent.* **1** : 572.

The single type specimen in the Fabricius private collection, which has been impossible to sex externally, is almost completely black in colour. It is a most characteristic species, belonging to a different part of the genus from the other European representatives of *Laemophloeus* s.s.

(3) *Notolaemus* **gen. n.** (Figs. 11–15)

This distinct genus is represented by species in Asia, America, Africa and by two species in Europe.

Head with eyes as wide as or slightly wider than long without trophi; eyes moderately prominent, occupying less than one half lateral margin of head; front of head with five sinuations, a central labral and small paired mandibular and antennal (sometimes obsolete); frontoclypeal suture usually visible but not situated at the base of a groove; lateral carinae present; antennae about equal in length in both sexes, second and fourth segments about equal in length and shortest, other segments longer, last three not forming a recognisable club; *labrum* slightly transverse, slightly emarginate anteriorly (fig. 12); *mandibles* rather narrower than is usual for the sub-family, with small prostheca and with three teeth apically (fig. 13); *maxilla* with terminal segment of palpi moderately dilated almost until the apex, about two and a half times as long as preceding segment, with the lacinia two-pointed (fig. 14); *labium* with terminal segment of palpi almost as long as preceding segments combined, with the ligula slightly emarginate anteriorly (fig. 15).

Pronotum transverse, cordiform, front and hind angles moderately prominent; broader than head, lateral margins sometimes irregularly rounded; lateral carinae forming a definite discal region. *Scutellum* triangular with rounded angles. *Elytra* broader between shoulders than pronotum, without lateral carinae; usually leaving tip of abdomen exposed at the mid-line; striae often reduced or absent.

Coxae separated from each other by a distance equal to that separating them from the lateral margin; anterior coxal cavities open posteriorly; intercoxal process of first abdominal sternite slightly rounded anteriorly, this sternite twice as long as the second at the mid-line, sternites 2 to 5 equal in length.

Legs about equal in length; femora moderately dilated; terminal tarsal segment about as long as the preceding four together; tarsal formula in *female* 5–5–5, in *male* 5–5–4.

Generic type species, *Cucujus unifasciatus* Latreille, 1804.

Key to European species of Notolaemus *gen. n.*

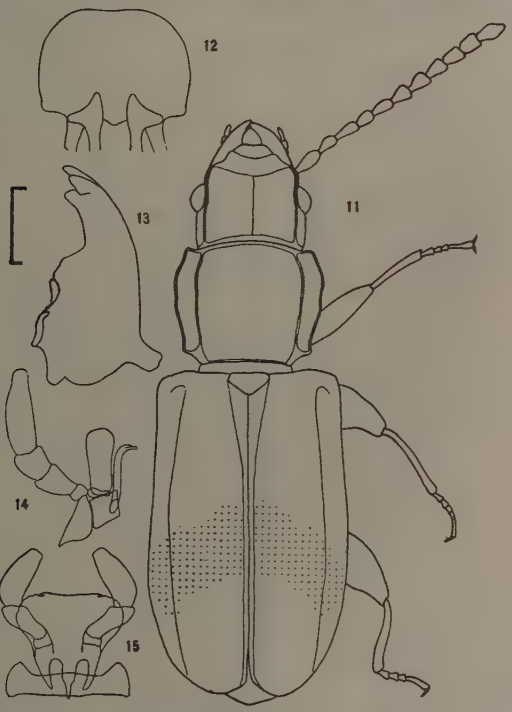
Uniformly dark brown in colour . . . **castaneus** (Erichson) **comb. nov.**

– Testaceous, with a darker mark on each elytron
unifasciatus (Latreille) **comb. nov.**

Notolaemus castaneus (Erichson) **comb. nov.**

Laemophloeus castaneus Erichson, 1846, *Naturgesch. Ins. Deutsch.* Abt. 1, 3 : 318.

The two syntypes in the Erichson collection disagree with the original description in that they are dark brown in colour and not black. In all other details the specimens agree (it should be noted that the specific name refers



FIGS. 11–15.—*Notolaemus unifasciatus* (Latr.) : (11) dorsal view ; (12) labrum ; (13) mandible ; (14) maxilla ; (15) labium. Scale line for adult 0·28 mm. ; for trophi 0·1 mm.

to the original host plant *Castanea vesca* and not to the colour of the adults). I hereby select one of these syntypes (the other has a slightly damaged elytron), a male, as lectotype of the species. It bears the number 8174 and the accompanying label bears the following data : " castaneus/Rosenh. Er/Tirol. Rosenh.". This species has been recorded from under the bark of birch and chestnut.

Notolaemus unifasciatus (Latreille) **comb. nov.**

Cucujus bimaculatus Paykull, 1801, *K. svenska VetenskAkad. Handl.* **22** : 121, *nec* Olivier, 1795.

Cucujus unifasciatus Latreille, 1804, *Histoire Naturelle* **11** : 256.

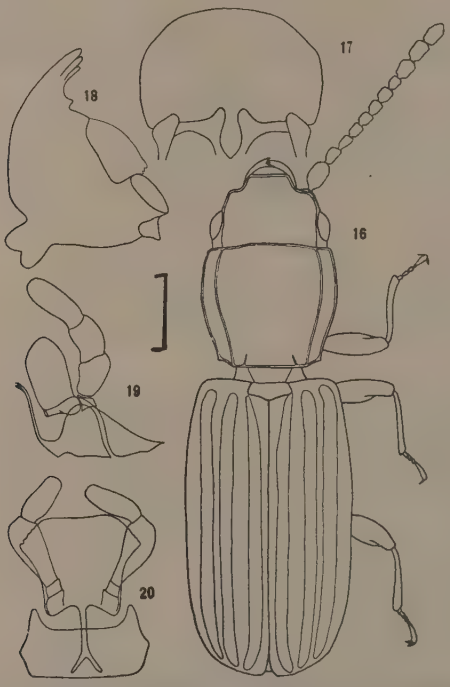
Laemophloeus fasciatus Stephens, 1839, *Manual of the British Coleoptera* : 142.

The types of *C. bimaculatus* and of *C. unifasciatus* appear to be lost; that of *L. fasciatus* is in the British Museum (Natural History).

This very distinct species occurs under the bark of oak, beech and hornbeam in the burrows of *Dryocoetes villosus* (F.).

(4) *Cryptolestes* Ganglbauer (Figs. 16–35, 46)

Leptus Thomson, 1863, *Skandinaviens Coleoptera* **5** : 92, 95, *nec* Latreille, 1796; *nec* Duftschmid, 1825.
Cryptolestes Ganglbauer, 1899, *Käfer Mitteleuropa* **3** : 608, 612.
Fractophloeus Kessel, 1921, *Arch. Naturgesch.* **87** : 28, **syn. nov.**



Figs. 16–20.—*Cryptolestes ferrugineus* (Steph.): (16) dorsal view; (17) labrum; (18) mandible; (19) maxilla; (20) labium. Scale line for adult 0.28 mm; for trophi 0.1 mm.

Distinguishing features of this genus are given by Casey (1916) and Lefkovitch (1958*a*). A dorsal view and the mouthparts are illustrated in figures 16–20 for comparison with those of the other genera.

A few species of this world wide genus are commonly introduced into Europe with commerce. These are included in the key since at least one of them is now certainly an established breeding species and another shows signs of becoming so.

Key to European species of Cryptolestes *Ganglbauer*

In using this key, it should be noted that the frontoclypeal suture can be satisfactorily examined only from cleared specimens.

1 Pronotum with two lateral carinae on each side . . **duplicatus** (Waltl)
– Pronotum with one lateral carina on each side 2
2 Elytra at most 2·25 times as long as their combined width; with antennae longer than head and pronotum in both sexes 3
– Either elytra more than 2·25 times as long as their combined width or antennae shorter than head and pronotum in both sexes . . . 11
3 Elytra truncate apically . . . . **fractipennis** (Motschulsky), *males*
– Elytra evenly rounded to apico-sutural angle 4
4[1] Males with antennae much longer than those of female, nearly as long as or as long as the body; males without external mandibular tooth 5
– Males with antennae hardly longer than those of female, only reaching the basal third of the elytra; males with an external mandibular tooth 7
5 Pronotum quadrate or narrowing slightly basally, hind angles very prominent; frontoclypeal suture bulging towards the mouthparts **turcicus** (Grouvelle)
– Pronotum not quadrate except in some small specimens, usually 1·25–1·5 times as wide as long; frontoclypeal suture bulging away from the mouthparts 6
6 Pronotum 1·25 times as wide as long; elytra longer in proportion to head and pronotum . . . . . **pusilloides** (Steel and Howe)
– Pronotum 1·5 times as wide as long; elytra shorter in proportion to rest of body . . . . . **pusillus** (Schönherr)
7 Hind angles of pronotum distinct; pronotum slightly narrower basally than apically; frontoclypeal suture bulging towards the mouthparts 8
– Hind angles of pronotum obsolescent; pronotum markedly narrowed basally; frontoclypeal suture bulging away from the mouthparts . 10
8 Head and pronotum shining, sparsely and finely punctured **ferrugineus** (Stephens)
– Head and pronotum dull, densely and coarsely to rugosely punctured 9
9 Second antennal segment 1·25 times as long as and more robust than the third segment . . . . . **fractipennis** (Motschulsky), *females*
– Second antennal segment very slightly shorter than the third segment, both segments about equally robust . . . . **corticinus** (Erichson)
10 Body black, legs reddish (in very young adults body unicolorous, entirely ferruginous) . . . . . **spartii** (Curtis)
— Body and legs entirely ferruginous . . . . . **capensis** (Waltl)
11 Antennae in male longer than half the body length, in female shorter; ninth and tenth antennal segments longer than wide; disc of pronotum convex . . . . . **abietis** (Wankowicz)
— Antennae shorter than half the body length in both sexes; ninth and tenth segments transverse or at least as wide as long; disc of pronotum flattened . . . . . **weisei** (Reitter)

[1] Separation of the species into two groups upon easily visible female characters is difficult to make here and has not been attempted in the key: however, couplets 5 and onwards work equally well for both sexes. The genitalia should be examined in doubtful specimens (figs. 21–35).

Certain male structures accessory to the genitalia, and the secondary spermatheca in the female, features which in general show specific differences, are illustrated in figs. 21–35.

Cryptolestes duplicatus (Waltl)

Cucujus duplicatus Waltl, 1839, *Isis*, Jena **3** : 225.

There are two specimens in the original type series, a male and a female. These both agree with Waltl's original description, the only difference between them, other than the usual sexual differences, being that the prothorax of the male is more narrowed basally than is that of the female. I hereby select the male as lectotype of the species.

C. duplicatus is usually found under the bark of beech, oak, poplar and very rarely in stored food.

Cryptolestes corticinus (Erichson)

Laemophloeus corticinus Erichson, 1846, *Naturgesch. Ins. Deutsch.* Abt. 1, **3** : 327.
Laemophloeus krüperi Reitter, 1879, *Verh. zool.-bot. Ges. Wien* **29** : 87, **syn. nov.**

The five syntypes in the Erichson collection were examined and found to consist of two males and three females. The only data with these specimens (other than the number 8202 on each pin) are on a separate label. This reads " *corticinus* Erichs. Europa Berol.". I hereby select the larger male as lectotype of the species.

Six specimens of the original series of *Laemophloeus krüperi* Reitter have been examined. One specimen, a male, is labelled : " *krüperi* Olymp/*alternans* Olymp Krüper " in Reitter's handwriting and " Holotypus 1879 *Laemophloeus Krüperi* Reitter " by the museum authorities at Budapest. This male I hereby select as lectotype of the species. The six specimens are clearly the same species as *Cryptolestes corticinus* (Erichs.), having identical shapes, proportions, puncturation and spermathecae in the female (the male genitalia have not been examined).

C. corticinus has been recorded from under the bark of oak and of conifers.

Cryptolestes fractipennis (Motschulsky)

Loemophloeus (sic) *fractipennis* Motschulsky, 1845, *Bull. Soc. Nat. Mosc.* **18** : 91.
Laemophloeus dufourii Laboulbène, 1848, *Ann. Soc. ent. Fr.* (2) **6** : 297.

It has not been possible to examine the types of either *L. fractipennis* or *L. dufourii*. However, the distinctive external apical elytral angles in the male serve to distinguish this species from other European *Cryptolestes*. Kessel (1921) erected a sub-genus *Fractophloeus* by the following : " Bei den ♂♂ sind die Flügel am Apikalende nicht abgerundet sondern abgestutzt und der Aussenwinkel ist etwas nach aussen vorgezogen." He listed five species in this group which, on detailed examination, have proved to be only distantly related. One of these five species is *C. fractipennis* and I hereby select that species to be the type of *Fractophloeus* Kessel. *Fractophloeus* therefore becomes a junior synonym of *Cryptolestes*.

C. fractipennis has been recorded from the burrows of *Crypturgus pusillus* (Gyll.) under pine bark.

Cryptolestes turcicus (Grouvelle)

Laemophloeus turcicus Grouvelle, 1876, *Ann. Soc. ent. Fr.* (5) **4** : xxxii.

A personal search for the type of this important economic species in the Muséum National d'Histoire Naturelle, Paris, and the Deutsches Entomologisches Institut, Berlin, failed to reveal any of the original material of this species in the Grouvelle and Javet collections respectively (Grouvelle 1876, 1877). Mons. A. Villiers of the museum at Paris suggested that the specimens from the Grouvelle collection may have inadvertently been sent to the Zoologisches Staatsinstitut und Zoologisches Museum, Hamburg, but, on making a careful search of the material there, the Grouvelle material of this species could not be found. In the British Museum (Natural History), a specimen from the Grouvelle collection labelled " *Laemophloeus turcicus* Gr." in Grouvelle's handwriting was considered by Mr. J. Balfour-Browne of that museum to be a syntype. I hereby select that specimen to be the lectotype of *Laemophloeus turcicus* Grouvelle, 1876. This specimen is the same species as that called *L. turcicus* Gr. by Reid (1942), who illustrated the genitalia of both sexes, and called *Cryptolestes turcicus* (Gr.) by Howe and Lefkovitch (1957). This species was shown by Howe and Lefkovitch (*op. cit.*) to be the usual species of the genus found in milling machinery in Europe.

Cryptolestes pusilloides (Steel and Howe)

Laemophloeus pusilloides Steel and Howe, 1952, *Proc. R. ent. Soc. Lond.* (B) **21** : 86.

The holotype and some paratypes of this important economic species have been examined in great detail. It has been very surprising to the author that this species, so abundantly found at the present time, is not represented in the older European collections examined and by only a very few specimens collected between the years 1940–1950. Howe and Lefkovitch (1957) showed that the species was mainly southern in its distribution ; however, Mr. R. W. Howe has informed the author that it is present in North American collections, although only in small numbers.

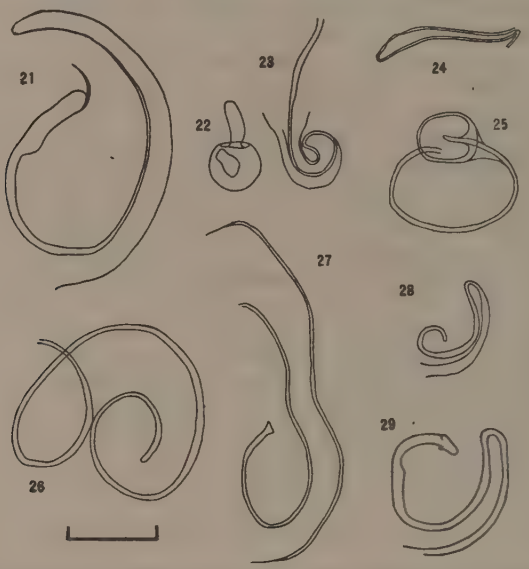
C. pusilloides is commonly imported into Europe on cereals from the southern hemisphere ; it has perhaps become a breeding species in Iberia.

Cryptolestes pusillus (Schönherr)

Cucujus minutus Olivier, 1791, *Encycl. Méth.* **6** : 243, *nec* Fourcroy, 1785.
Cucujus pusillus Schönherr, 1817, *Synonymia Insectorum* **1** (3) : 55.
Cucujus testaceus Stephens, 1831, *Ill. Brit. Ent. Mandib.* **4** : 224.
Cucujus crassicornis Waltl, 1839, *Isis*, Jena **3** : 225.
Laemophloeus longicornis Mannerheim, 1843, *Bull. Soc. Nat. Mosc.* **16** : 303.
Loemophloeus (sic) *brevis* Fairmaire, 1850, *Rev. Mag. Zool.* (2) **2** : 56.
Laemophloeus parallelus Smith, 1851, *List of Coleoptera in the British Museum* **1** : 7.
Laemophloeus pauper Sharp, 1899, *Biol. C. Amer. Col.* **2** (1) : 530.

The present author has been able to examine the type specimens of *Cucujus testaceus* Stephens, *Laemophloeus parallelus* Smith and *L. pauper* Sharp. That of *Cucujus minutus* Olivier appears to be lost. The name *Cucujus pusillus* was proposed by Schönherr because of the homonymy of Olivier's species.

Cryptolestes pusillus is one of the most abundant of the sub-family found in food stored in the tropics and is commonly imported into Europe.



FIGS. 21–29.—Spermathecae of *Cryptolestes*: (21) *C. ferrugineus*; (22) typical "bulb" spermatheca present in all species; (23) *C. pusillus*; (24) *C. turcicus*; (25) *C. pusilloides*; (26) *C. corticinus*; (27) *C. capensis* and *C. spartii*; (28) *C. duplicatus*; (29) *C. fractipennis*. Scale line 0·1 mm.

Cryptolestes ferrugineus (Stephens)

Cucujus testaceus Paykull, 1799, *Fauna Suecica* **2** : 168, *nec* Fabricius, 1787.
Cucujus ferrugineus Stephens, 1831, *Ill. Brit. Ent. Mandib.* **4** : 223.
Cucujus monilicornis Stephens, *op. cit.*
Laemophloeus concolor Smith, 1851, *List of Coleoptera in the British Museum* **1** : 6.
Laemophloeus obsoletus Smith, *loc. cit.* : 7.
Laemophloeus emgei Reitter, 1887, *Dtsch. ent. Z.* **31** : 286, **syn. nov.**

The author has been able to examine the type specimens of Stephens' and Smith's species. Of *Laemophloeus emgei* Reitter six specimens purporting to be types have been seen. Of these, the two in the Reitter collection agree the most closely with the original description (which consists mainly of a list of differences from *C. ferrugineus*). One of these two specimens is labelled "Graecia. *L. emgei* m 1887" in Reitter's handwriting and "Holotypus" by the Budapest museum authorities. I hereby select that specimen to be the lectotype of *Laemophloeus emgei* Reitter.

The differences Reitter listed between his species and *Cryptolestes ferrugineus* (Steph.) are very slight and are well within the normal range of heterogony of the latter species. Since, in addition, Reitter's species has genitalia identical with those of *C. ferrugineus*, I consider the two species identical.

C. ferrugineus is cosmopolitan on stored foods but has also been recorded from under bark, in an aphid gall and in soil.

Cryptolestes spartii (Curtis)

Cucujus ater Olivier, 1795, *Entomologie* **4** : 9, *nec* Fourcroy, 1785.
Cucujus piceus Stephens, 1831, *Ill. Brit. Ent. Mandib.* **4** : 223, *nec* Olivier, 1795.
Cucujus spartii Curtis, 1834, *British Entomology* **11** : 510.

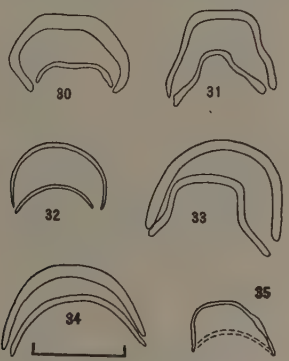
Of this easily recognizable species, it has only been possible to examine the type of *C. piceus*. The figures given by Olivier and Curtis with their descriptions are sufficiently accurate to enable an entomologist familiar with the group to identify the species.

C. spartii occurs in the dying stems of broom and gorse in the company of *Phloeophthorus rhododactylus* (Marsh.) and other scolytids ; it has also been recorded from under elm bark and associated with *Hypoborus ficus* Er. under fig bark.

Cryptolestes capensis (Waltl)

Cucujus capensis Waltl, 1834, *Faunus* **1** : 169.

Until recently, it was thought that this species was merely a colour variety of *C. spartii* (Curtis) (*see* Howe and Lefkovitch, 1957). Recent investigations



Figs. 30–35.—Sclerites associated with male genitalia of *Cryptolestes* : (30) *C. duplicatus* ; (31) *C. turcicus* ; (32) *C. pusilloides* ; (33) *C. capensis* and *C. spartii* ; (34) *C. ferrugineus* ; (35) *C. pusillus*. Scale line 0·1 mm.

(Lefkovitch, 1959) have shown that the two colour forms represent distinct species. It has not been possible to locate the type of this species.

C. capensis is found in provender and flour mills.

Cryptolestes abietis (Wankowicz)

Laemophloeus abietis Wankowicz, 1865, *Ann. Soc. ent. Fr.* (4) **5** : 298.

According to Dr. M. Mroczkowski, of the Polish Academy of Sciences, the Wankowicz collection was destroyed by fire in 1944 and it is probable that those specimens of *C. abietis* retained by Wankowicz in his own collection no longer exist. However, in the Reitter collection, there are two specimens of this species, one labelled in manuscript " *L. abietis* Wank. Typ. Lithanen "[2]; it

[2] It has been impossible for the author to discover who, what or where " Lithanen " is.

is reasonable to assume that these specimens are syntypes since Wankowicz in his original description wrote " Plusieurs individus, pris aux environs de Minsk ". Both these specimens agree very closely with the original description. I hereby select the specimen bearing the MSS data given above to be the lectotype of the species.

C. abietis has been recorded from under the bark of conifers in the company of *Ips typographus* (L.) and *Polygraphus subopacus* Thoms. Zinov'ev (1958) describes it as a facultative predator.

Cryptolestes weisei (Reitter)

Laemophloeus weisei Reitter, 1879, *Verh. zool.-bot. Ges. Wien* **29** : 78.

There are two " type " specimens of this species known to the author—one in the Reitter collection in Budapest, the other in the Grouvelle collection, Paris. The Budapest specimen agrees the more closely with the original description and I hereby select it as lectotype of the species. This species is distinct from other European *Cryptolestes* in having very short antennae in both sexes, recalling those of *Leptophloeus*. However, the flattened body section serves to distinguish it from those of that genus.

Nothing is known of the biology of this species.

(5) *Placonotus* Macleay (Figs. 36–40)

Placonotus Macleay, 1871, *Trans. ent. Soc. N.S.W.* **2** : 168.
Silvanophloeus Sharp, 1899, *Biol. C. Amer. Col.* **2** : 537, **syn. nov.**

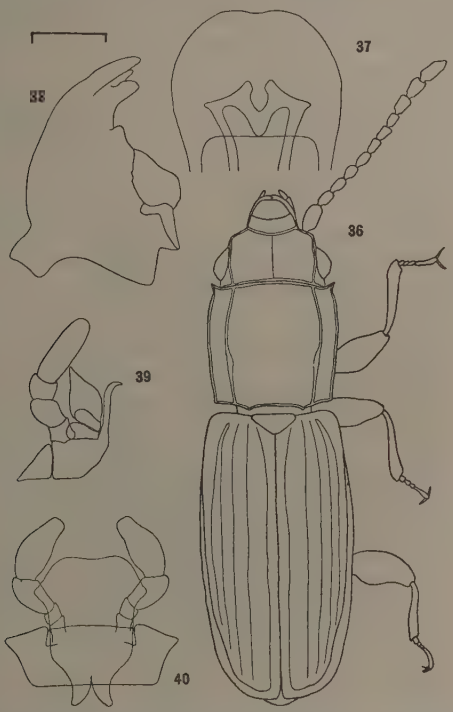
It is difficult to decide which of the numerous Australian species possessing the distinguishing features of the genus is *longicornis* Macleay, the type of Macleay's genus. The description given below is based on the type of *Silvanophloeus*, which is *Cucujus testaceus* Fabricius. *Placonotus* is represented in all parts of the world.

I am indebted to Mr. W. O. Steel for pointing out this synonymy to me.

Head transverse, carinate laterally ; eyes moderately protruding, usually occupying more than half the lateral margin of the head ; front of head with a single shallow emargination ; frontoclypeal suture situated at the base of a transverse groove ; *antennae* in *female* reaching basal third of elytra, scape moderately enlarged, segments 2 to 8 about equal in size, segments 9 to 11 slightly enlarged forming a loose club ; *antennae* in *male* elongated ; *labrum* about as wide as long, with a distinct but shallow median emargination anteriorly (fig. 37) ; *mandibles* with three teeth apically and with large prostheca, just anterior to prostheca a moderately projecting region (fig. 38) ; *maxillae* with a single pointed lacinia, with terminal segment of palpi three and a half times as long as the preceding segment (fig. 39) ; *labium* with ligula broadly but shallowly emarginate anteriorly, with terminal segment of palpi longer than the others combined (fig. 40).

Pronotum as wide as long, sometimes slightly transverse, front angles forming an acute tooth, hind angles well developed ; a distinct discal region formed by the lateral carinae, these containing a small pit just behind the mid-point which is very deep in some species. *Scutellum* triangular. *Elytra* with or without visible striae, carinate laterally, leaving at least part of terminal segment of abdomen exposed, in some species this segment entirely exposed.

Anterior coxae narrowly closed posteriorly ; *mesosternum* apparently fused to *metasternum* ; intercoxal process of first visible abdominal sternite slightly rounded anteriorly, this sternite one and half a times as long as the second, sternites 2 to 4 about equal in length, fifth variable in length, sometimes longer than first.



Figs. 36–40.—*Placonotus testaceus* (F.) : (36) dorsal view ; (37) labrum ; (38) mandible ; (39) maxilla ; (40) labium. Scale line for adult 0·28 mm. ; for trophi 0·1 mm.

Legs about equal in length ; last tarsal segment about as long as preceding four combined; tarsal formula in *female* 5–5–5, in *male* 5–5–4.

There is only one species from Europe, *Placonotus testaceus* (Fabricius).

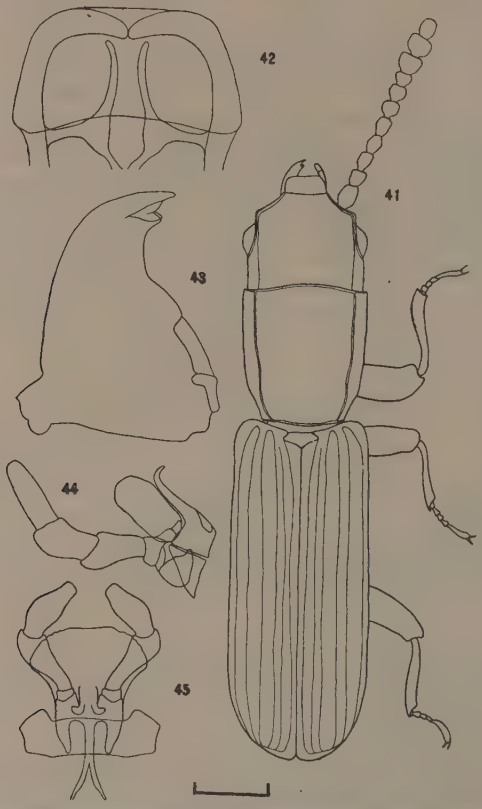
Placonotus testaceus (Fabricius) **comb. nov.**

Cucujus testaceus Fabricius, 1787, *Mantissa Insectorum* **1** : 166.
Laemophloeus suberis Lucas, 1849, *Expl. Sci. Algérie. Crustacés. Arachnides, Myriapodes et Hexapodes* **2** : 479.
Laemophloeus notatithorax Obenberger, 1917, *Arch. Naturgesch.* **82** (A4) : 25, **syn. nov.**

It has not been possible to examine the type of this most distinct and well known species.

The holotype of *Laemophloeus notatithorax* Obenberger was found to be, as the original description suggests, a normal female specimen of *Placonotus testaceus* (F.).

This species has been recorded under the bark of lime, of beech ; in the galleries of *Scolytus* ; under chestnut bark with *Dryocoetes capronatus* ; under dead oak bark, and in the galleries of *Pteleobius vittatus* (F.) and *P. kraatzi* Eich. in elm.



Figs. 41–45.—*Leptophloeus clematidis* (Er.) : (41) dorsal view ; (42) labrum ; (43) mandible ; (44) maxilla ; (45) labium. Scale line for adult 0·28 mm. ; for trophi 0·1 mm.

(6) *Leptophloeus* Casey (Figs. 41–45, 47)

Leptophloeus Casey, 1916, *Mem. Col.* **7** : 119.

This genus contains species throughout the world. Its type is *Leptophloeus angustulus* (Leconte), a species occurring in North America. The genus differs from most other members of the Laemophloeinae in that the body is more cylindrical, the tarsal formula 5–5–5 in both sexes and in that the antennae are comparatively short.

Head slightly wider across eyes than long without trophi, eyes usually well in advance of the base of the head, occupying less than one half of the lateral margin; epistome straight or very slightly curved; lateral carinae present; frontoclypeal suture obsolete; *antennae* short, identical in both sexes, rarely as long as head and pronotum together, usually shorter, terminal three segments forming a recognisable club; derm rugose or simply punctured; *labrum* twice as wide as long, straight anteriorly (fig. 42); *mandibles* smoothly curved between prostheca and apical teeth (fig. 43); *maxillae* with one-pointed lacinia, with terminal segment of palpi one and a half times as wide as but half the diameter of the preceding segment (fig. 44); *labium* with ligula almost straight anteriorly, with terminal segment of palpi shorter than preceding segment (fig. 45).

Pronotum usually longer than wide, rarely transverse; hind angles variable in the degree of development, sometimes represented by only a slight sinuation; lateral carinae present forming a distinct discal region. *Scutellum* transverse, pentagonal. *Elytra* usually more than twice as long as their combined width, entirely concealing abdomen, usually striate and carinate laterally.

Front and middle *coxae* equally separated by distance equal to half width of a coxa, hind coxae separated by about twice this distance; anterior coxal cavities very narrowly open posteriorly; thoracic and abdominal sternites curved dorsally away from the mid-line giving the animal a semi-cylindrical to cylindrical appearance (fig. 47); intercoxal process of first visible abdominal *sternite* rounded anteriorly, this sternite twice as long at the mid-line as the second, second and third sternites equal in length, fourth and fifth sometimes longer than second and third.

Legs about equal in length; terminal tarsal segment about as long as the preceding three; tarsal formula in both sexes 5–5–5.

Key to European species of Leptophloeus *Casey*

1 Posterior angles of pronotum prominent; head simply punctured . 2
– Posterior angles of pronotum not prominent; head rugosely punctured 5
2 Eyes larger, the distance between them and the base of the head less than 0·25 times their diameter . . . . . **janeti** (Grouvelle)
– Eyes smaller, the distance between them and the base of the head more than 0·5 times their diameter 3
3 Yellowish-red in colour; males with mandibles dilated externally towards their base . . . . . **alternans** (Erichson)
– Reddish-brown in colour; males without mandibles dilated externally towards their base 4
4 Pronotum wider than long; elytra about 2·25 times as long as their combined width . . . . . **juniperi** (Grouvelle)
– Pronotum slightly longer than wide; elytra about 3·5 times as long as their combined width . . . . . **perrisi** (Grouvelle)
5 Elytra convex between the external margin of the disc and the suture; striae alternately deep and shallow . . . . . **hypobori** (Perris)
– Elytra flat between the external margin of the disc and the suture; evenly striate . . . . . **clematidis** (Erichson)

Leptophloeus juniperi (Grouvelle) **comb. nov.**

Laemophloeus juniperi Grouvelle, 1874, *Ann. Soc. ent. Fr.* (5) **4** : xxviii.

It has not been possible to locate the type of this species; it was not present in the Grouvelle collection when examined by the writer.

L. juniperi has been recorded from under the bark of *Juniperus*, *Cupressus* and *Thuja* in the galleries of *Phloeosinus thujae* (Perr.) and *Taphrorychus bicolor*

(Herbst) feeding on the larvae, under fig bark and elm bark in the galleries of *Pteleobius vittatus* (F.) and *P. kraatzi* Eich., in the galleries of *Liparthrum mori* on mulberry, and in the galleries of *Phloeotribus scarabacoides* Bern. on olive.

Leptophloeus janeti (Grouvelle)

Laemophloeus janeti Grouvelle, 1899, *Ann. Soc. ent. Fr.* **68** : 177.

The type of this species was not found in the Grouvelle collection after a thorough search and it has not been possible to locate it elsewhere.

L. janeti is imported occasionally from Africa, usually in cocoa, together with the much more common *Cryptolestes pusillus* (Schön.).

Leptophloeus alternans (Erichson) **comb. nov.**

Laemophloeus alternans Erichson, 1846, *Naturgesch. Ins. Deutsch.* Abt. 1, **3** : 325.
Laemophloeus brevicornis Thomson, 1863, *Skandinaviens Coleoptera* **5** : 97, **syn. nov.**
Laemophloeus deliculatus Obenberger, 1917, *Arch. Naturgesch.* **82** (A4) : 26, **syn. nov.**

There are two syntypes of *L. alternans* in the Erichson collection, both males. These both agree equally with the original description ; their data consist of a single label on each pin bearing the number 8208 and an associated label with " *alternans* Er. Berol. Schüppl.". I hereby select one of these specimens, a male, to be lectotype of the species.

The single specimen of *L. brevicornis* Thomson in the Boheman collection is the unique type since Thomson, 1863, recorded the specimens as being collected by Boheman. Dr. A. Strand of Oslo, in a letter, expressed the opinion that this specimen is a female *L. alternans* ; this opinion was confirmed by the present author on comparison of the types.

The holotype of *L. deliculatus* Obenberger (probably a female) was found to be the same species as *L. alternans*.

L. alternans has been recorded in the galleries of *Polygraphus* and *Pityogenes* in conifers and in the galleries of *Hypoborus ficus* Er. on fig trees.

Leptophloeus perrisi (Grouvelle) **comb. nov.**

Laemophloeus perrisi Grouvelle, 1876, *Ann. Soc. ent. Fr.* (5) **6** : xxii.

It has not been possible to locate the type of this species. It has been recorded under the bark of fig, almond and pistachio trees, and in the galleries of *Chaetoptelius vestitus* (Muls. and Rey).

Leptophloeus hypobori (Perris) **comb. nov.**

Loemophloeus (sic) *hypobori* Perris, 1855, *Ann. Soc. ent. Fr.* (3) **3** : lxxvii.

A single specimen labelled " Typus " and formerly in Stierlin's collection was found in the Deutsches Entomologisches Institut, Berlin. This specimen agrees with the original description and is therefore accepted as the type of the species.

L. hypobori is apparently confined to the galleries of *Hypoborus ficus* Er. on fig trees.

Leptophloeus clematidis (Erichson) **comb. nov.**

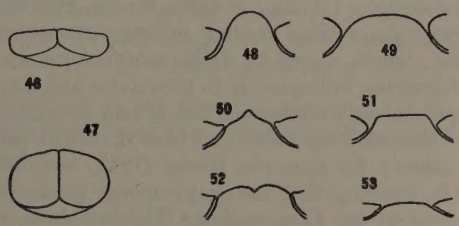
Laemophloeus clematidis Erichson, 1846, *Naturgesch. Ins. Deutsch.* Abt. 1, 3 : 326.

There are four syntypes of this species in the Erichson collection. I hereby select the first specimen in the series as the lectotype of the species. It agrees in all respects with the original description and bears the number 8201. The accompanying label has the following data : " *clematidis* Chevr. Er. Helvet. Schüpp. Lutet. Aube."

L. clematidis occurs in the galleries of *Xylocleptes bispinus* (Duft.) in *Clematis vitalba* L.

V. Discussion

At the present state of knowledge, the relationship of the European genera to each other is difficult to determine. It seems quite likely from preliminary studies that the structure of the genitalia and accessory structures in both sexes will be of great value in showing relationships. Certain of the accessory structures have been useful in enabling accurate identifications of the species



Figs. 46–47.—Posterior views : (46) *Cryptolestes ferrugineus* ; (47) *Leptophloeus clematidis.*

Figs. 48–53.—Intercoxal processes of first abdominal segment : (48) *Leptophloeus, Dysmerus* ; (49) *Cryptolestes, Lathropus* ; (50) *Laemophloeus, Rhinomalus, Rhinophloeus* ; (51) *Placonotus, Parandrita, Microbrontes* ; (52) *Brontolaemus* ; (53) *Notolaemus.*

of *Cryptolestes* to be made ; however, entire reliance cannot be placed upon these structures for specific determination since, for example, *C. capensis* and *C. spartii* appear to have identical genitalia but are nevertheless distinct species (Lefkovitch, 1959). It would be premature to give here a detailed account of the general form of the genitalia of the European Laemophloeinae, since such descriptions without those of the non-European genera would not make much real addition to information previously published. It is hoped that a later study will consider these structures in the world genera of Laemophloeinae.

Only one structural point of comparison will be considered in the present paper, the inter-coxal process of the first abdominal segment. In *Laemophloeus* s.s., *Rhinomalus* and *Rhinophloeus*, this process is pointed anteriorly (fig. 50), in *Leptophloeus* and *Dysmerus* it is narrowly rounded (fig. 48), in *Cryptolestes*, *Notolaemus* and *Lathropus* it is broadly rounded (figs. 49, 53) and in *Microbrontes*, *Parandrita* and *Placonotus* it is straight anteriorly (fig. 51). In *Brontolaemus* a quite different arrangement occurs (fig. 52).

Leptophloeus is a genus which in general shows no external sexual dimorphism, a feature normally present in the subfamily. However, *L. alternans* possesses

mandibles showing a dimorphism similar to that shown by some species of *Cryptolestes* (e.g. *C. ferrugineus*), although in other respects it appears to be a quite normal species for its genus. It is therefore possible that the American *Dysmerus* is not so distinct from *Leptophloeus* as was previously considered (Lefkovitch, 1958*b*), since the argument for not synonymising *Dysmerus* with *Leptophloeus* was based entirely upon the absence of external sexual dimorphism in the latter genus. The paucity of material of *Dysmerus* in British collections has prevented the comparative work necessary for reaching a definite conclusion on this point.

In their biology, the European Laemophloeinae may be considered to be corticoles, living in the galleries of scolytids. Some associations appear to be specific, e.g. *Leptophloeus hypobori* with *Hypoborus ficus*, whereas other species are more general in their feeding habits. Some species of *Cryptolestes* occur very frequently in stored food and can live entirely on cereals, although they will eat their own quiescent stages and those of other insects infesting the same food. It is possible to see a gradation of species from the corticole habit to that of infesting stored products. *C. spartii* occurs naturally in the burrows of *Phloeophthorus rhododactylus* (Marsh.) in dying broom, but can be bred successfully through several generations feeding entirely upon cereals (Lefkovitch, 1959); *C. capensis*, which seems to differ morphologically from *C. spartii* only in colour, is found not infrequently in provender and flour-mills; whereas *C. ferrugineus*, a quite closely related species, is very abundant in stored foods. This link between the corticole habit and that of stored products is seen in other groups of insects; for example, Butler (1949) has discussed this point in the Tenebrionids, showing that the major stored products' representatives of that family belong to the Ulominae and Tenebrioninae, which are insects of predominantly corticole habit.

If it is possible to deduce function from structure, it seems likely that the trophi of many non-European Laemophloeinae, and of *Notolaemus* in Europe, indicate a predatory habit as adults (figs. 12–15).

Certain introduced species, recorded on less than five occasions each, have not been included in the taxonomic section of this paper. These are *Cryptolestes ugandae* Steel and Howe, *C. truncatus* (Casey), *Laemophloeus* (s.l.) *laevior* Reitter, *L.* (s.l.) *glabriculus* Grouvelle and *L.* (s.l.) *divaricatus* Grouvelle. All the specimens called *Laemophloeus elongatulus* Lucas, which is given by Lechanteur (1950) as occurring in southern France, that I have examined were large specimens of either *Cryptolestes ferrugineus* (Steph.) or *C. capensis* (Waltl). Whether Lucas' species is "good" can only be verified by examination of the type specimens. The two varieties of *Cryptolestes ferrugineus* (Steph.) described by Rey (var. *exilis* and var. *perplexius*) appear from their brief descriptions not to belong to that species but to others. The variety *exilis* has very short antennae and, unless it is *C. weisei* (Reitt.), it is almost certainly a *Leptophloeus*; *perplexius* is described as differing from *C. pusillus* only in that the pronotum is narrowed basally. Synonymies, if necessary, cannot be established at present since it has not been possible to examine Rey's specimens.

VI. Summary

(1) The genera, including a new genus, of the European Laemophloeinae are described.

(2) Keys to the genera and to the species of each genus are provided; some new synonymies are given.

(3) Brief notes on the known biology of each of the species are given; the Laemophloeinae are considered to be facultatively predatory sub-corticoles in the main, although some species live in other habitats.

(4) Some structures in the adults which may prove to be of taxonomic value are considered.

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